

PART I.A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge from Outfall Serial Number 001 treated domestic wastewater effluent to the Sugar River. Such discharges shall be limited and monitored by the permittee as specified below. Samples taken in compliance with the monitoring requirements specified below shall be taken at the end of all processes, including disinfection, or at an alternative representative location approved by the EPA and NHDES-WD.

Effluent Parameter	Effluent Limit			Monitoring Requirement	
	Average Monthly	Average Weekly	Maximum Daily	Frequency	Sample Type
Flow, MGD	Report	---	Report	Continuous	Recorder
BOD ₅ ; mg/l (lb/d)	30 (325)	45 (488)	50 (542)	1/Week ²	Grab
TSS; mg/l (lb/d)	30 (325)	45 (488)	50 (542)	1/Week ²	Grab
pH Range ³ ; Standard Units	6.5 to 8.0 (See Section I.D.1.a.)			1/Day	Grab
Escherichia coli ⁴ ; Colonies/100 ml	126	---	406	2/Week	Grab
Ammonia Nitrogen as N; (mg/l)	Report	---	Report	2/Month	Grab
Total Recoverable Aluminum ⁵ ; (mg/l)	Report	---	Report	2/Month	Grab
Total Phosphorus; mg/l (April 1 through October 31)	0.42	---	---	1/Week	Grab
Total Phosphorus; mg/l (November 1 through March 31)	1.0	---	---	1/Week	Grab
Orthophosphorus; mg/l (November 1 through March 31)	Report	---	---	1/Week	Grab

SEE PAGE 4 FOR EXPLANATION OF FOOTNOTES.

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Effluent Parameter	Effluent Limit			Monitoring Requirement	
	Average Monthly	Average Weekly	Maximum Daily	Frequency	Sample Type
Whole Effluent Toxicity					
LC50 ^{6,8,9} ; Percent Effluent		Greater than or equal to 100%		4/Year	24 Hour Composite
C-NOEC ^{7,8,9} ; Percent Effluent		Greater than or equal to 13.3%		4/Year	24 Hour Composite
Hardness ⁹ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Ammonia Nitrogen as N ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Aluminum ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Cadmium ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Chromium ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Copper ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Lead ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Nickel ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite
Total Recoverable Zinc ¹⁰ ; mg/l	---	---	Report	4/Year	24 Hour Composite

SEE PAGE 4 FOR EXPLANATION OF FOOTNOTES.

EXPLANATION OF FOOTNOTES APPLICABLE TO PART I.A.1 on page 2

- (1) The effluent flow shall be continuously measured and recorded using a flow meter and totalizer.
- (2) The influent concentrations of both BOD₅ and TSS shall be monitored twice per month (2/Month) using a 24-hour composite sample and the results reported as average monthly values.
- (3) State certification requirement.
- (4) The average monthly value for Escherichia coli shall be determined by calculating the geometric mean and the result reported. Escherichia coli shall be tested using an approved method as specified in 40 C.F.R. Part 136, List of Approved Biological Methods for Wastewater and Sewage Sludge.
- (5) The requirement to perform aluminum monitoring twice per month shall only be effective if the permittee uses poly aluminum chloride (PAC) or any other aluminum based coagulant in the treatment process.
- (6) LC50 (lethal concentration 50 percent) is the concentration of wastewater (effluent) causing mortality to 50 percent of the test organisms. The permit limit of 100% is defined as a sample which is composed of 100 percent effluent.
- (7) The chronic no observed effect concentration (C-NOEC) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life-cycle or partial life-cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing where the test results (growth, survival, and/or reproduction) exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, report the lowest concentration where there is no observable effect. See Attachment A on page A-9 for additional information.

The C-NOEC limit of "equal to or greater than 13.3" is defined as a sample which is composed of 13.3% effluent. This is the minimum percentage of effluent at which no chronic effects will be observed.
- (8) The permittee shall conduct chronic and modified acute whole effluent toxicity tests on effluent samples using two species, daphnid (Ceriodaphnia dubia) and fathead minnow (Pimephales promelas) following the protocol listing in Attachment A (Freshwater Chronic and Modified Acute Toxicity Test Procedure and Protocol dated December 1995).

Toxicity test samples shall be collected and tests completed four (4) times each year during the calendar quarters ending March 31st, June 30th, September 30th, and December 31st. Toxicity test results are to be submitted by the 15th day of the month following the end of the quarter tested.

The permittee is authorized to use an alternate dilution water for toxicity tests. The chemical data for the alternative dilution water and the site water are to be submitted with the test results. The

alternate dilution water must be of a known quality with water quality characteristics such as organic carbon, total suspended solids, pH, specific conductivity, alkalinity and hardness similar to that of the Sugar River. It is recommended that the permittee screen the alternate dilution water for suitability prior to toxicity testing.

If the alternate dilution water is a lab water that does not require an adjustment to simulate the water chemistry of the receiving water as described in this part, then two controls are required: 1. lab water; and 2. site water.

(9) This permit shall be modified, or alternatively revoked and reissued, to incorporate additional toxicity testing requirements, including chemical specific limits if the results of the toxicity tests indicate the discharge causes an exceedance of any State water quality criterion. Results from these toxicity tests are considered "new information" and the permit may be modified as provided in 40 C.F.R. §122.62(a)(2).

(10) For each whole effluent toxicity test the permittee shall report on the appropriate DMR, the concentrations of ammonia nitrogen as nitrogen, hardness, and total recoverable aluminum, cadmium, chromium, copper, lead, nickel, and zinc found in the 100 percent effluent sample. All these aforementioned chemical parameters shall be determined to at least the minimum quantification level (ML) show in Attachment A on Page A-7, or as amended.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIRMENTS (Continued)

2. The discharge shall not cause a violation of the water quality standards of the receiving water.
3. The discharge shall be adequately treated to ensure that the surface water remains free from pollutants in concentrations or combinations that settle to form harmful deposits, float as foam, debris, scum, or other visible pollutants. It shall be adequately treated to ensure that the surface waters remain free from pollutants which produce odor, color, taste, or turbidity in the receiving waters which is not naturally occurring and would render it unsuitable for its designated uses.
4. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both BOD₅ and TSS. The percent removal shall be based on a comparison of average monthly influent and effluent concentrations.
5. When the effluent discharged for a period of 3 consecutive months exceeds 80 percent of the 1.3 mgd design flow, 1.04 mgd, the permittee shall submit to the permitting authorities, within 90 days following the occurrence of this period (3 consecutive months), a projection of loadings up to the time when the design capacity of the treatment facility will be reached and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans. Before the design flow will be reached, or whenever the treatment necessary to achieve permit limits cannot be assured, the permittee may be required to submit plans for facility improvements.

6. All Publicly Owned Treatment Works (POTWs) must provide adequate notice to both EPA-New England and the New Hampshire Department of Environmental Services – Water Division (NHDES-WD) of the following:

- a. Any new introduction of pollutants into the POTW from an indirect discharger in a primary industrial category (see 40 C.F.R. §122 Appendix A as amended) discharging process water;
- b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit; and
- c. For the purposed of this paragraph, adequate notice shall include information on:

- (1) the quantity and quality of effluent introduced into the POTW; and
- (2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

7. The permittee shall not discharge into the receiving water any pollutant or combination of pollutants in toxic amounts.

B. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and State laws and regulations that apply to sewage sludge use and disposal practices and with the Clean Water Act (CWA) Section 405(d) technical standards.

2. The permittee shall comply with the more stringent of either State (Env-Ws 800) or Federal (40 C.F.R. Part 503) requirements.

3. The technical standards (Part 503 regulations) apply to facilities which perform one or more of the following use or disposal practices.

- a. Land Application – The use of sewage sludge to condition or fertilize the soil.
- b. Surface Disposal – The placement of sewage sludge in a sludge only landfill.
- c. Fired in a sewage sludge incinerator.

4. The 40 C.F.R. Part 503 conditions do not apply to facilities that place sludge within a municipal solid waste landfill (MSWLF). Part 503 relies on 40 C.F.R. Part 258 criteria, which regulates landfill disposal, for sewage sludge disposed in a MSWLF. These conditions also do not apply to facilities which do not dispose of sewage sludge during the life of the permit, but rather treat the sludge (lagoon reed beds), or are otherwise excluded under 40 C.F.R. Part 503.6.

5. The permittee shall use and comply with the attached Sludge Compliance Guidance document to determine appropriate conditions. Appropriate conditions contain the following items:

- a. General Requirements
- b. Pollutant Limitations
- c. Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
- d. Management Practices
- e. Record Keeping
- f. Monitoring
- g. Reporting

Depending upon the quality of material produced by a facility all conditions may not apply to the facility.

6. If the sludge disposal method requires monitoring, the permittee shall monitor the pollutant concentrations, pathogen reduction, and vector attraction reduction at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year.

- a. less than 290.....1/Year
- b. 290 to less than 1,500.....1/Quarter
- c. 1,500 to less than 15,000.....6/Year
- d. 15,000 plus.....1/Month

7. The permittee shall perform all required sewage sludge sampling using the procedures detailed in 40 C.F.R. Part 503(h).

8. When the permittee is responsible for an annual report containing the information specified in the regulations, the report shall be submitted by February 19th of each year. Reports shall be submitted to the address contained in the reporting section of the permit.

9. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge use or disposal or when the sludge is disposed of in a MSWLF. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such cases, the permittee is required only to submit an annual report by February 19th of each year containing the following information:

- a. Name and address of the contractor responsible for sludge use and disposal.
- b. Quantity of sludge in dry metric tons removed from the facility.

Reports shall be submitted to the address contained in the reporting section of the permit.

C. MONITORING AND REPORTING

Monitoring results shall be summarized for each calendar month and reported on separate Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period.

Signed and dated original DMRs and all other reports or notifications required herein or in Part II shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114-8127

Duplicate signed copies (original signature) of all written reports or notifications required herein or in Part II shall be submitted to the State at:

New Hampshire Department of Environmental Services (NHDES)
Water Division
Wastewater Engineering Bureau
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095

All verbal reports or notifications shall be made to both EPA and NHDES.

D. STATE PERMIT CONDITIONS

1. The permittee shall comply with the following conditions which are included as State Certifications Requirements.

a. The pH range of 6.5-8.0 Standard Units (S.U.) must be achieved in the final effluent unless the permittee can demonstrate to NHDES-WD: (1) that the range should be widened due to naturally occurring conditions in the receiving water; or (2) that the naturally occurring receiving water pH is not significantly altered by the permittee's discharge. The scope of any demonstration project must receive prior approval from NHDES-WD. In no case, shall the above procedure result in pH limits outside the range of 6.0-9.0 S.U., which is the federal effluent limitation guideline regulation for pH for secondary treatment and is found in 40 C.F.R. §133.102(c).

b. Pursuant to State Law NH RSA 485-A:13 and the New Hampshire Code of Administrative Rules, Env-Wq 706.08(b) and Env-Ws 904.08, the following submission shall be made to NHDES-WD by a municipality proposing to accept into its POTW (including sewers and interceptors):

- (1) An "Application for Sewer Connection Permit" for any proposal to construct or modify any of the following:
 - (a) Any extension of a collector or interceptor, whether public or private, regardless of flow;
 - (b) Any wastewater connection or other discharge in excess of 5,000 gpd;
 - (c) Any wastewater connection or other discharge to a wastewater treatment facility operating in excess of 80 percent design flow capacity for 3 consecutive months;
 - (d) Any industrial wastewater connection or change in existing discharge of industrial wastewater, regardless of quality or quantity; and
 - (e) Any sewage pumping station greater than 50 gpm or serving more than one building.
 - (2) An "Industrial Wastewater Discharge Request Application" for new or increased loadings of industrial waste, in accordance with Env-Ws 904.10.
- c. The permittee shall not at any time, either alone or in conjunction with any person or persons, cause directly or indirectly the discharge of waste into the said receiving water unless it has been treated in such a manner as will not lower the legislated water quality classification or interfere with the uses assigned to said water by the New Hampshire Legislature (RSA 485-A:12).
 - d. Any modifications of the Permittee's Sewer Use Ordinance, including local limitations on pollutant concentrations, shall be submitted to the NHDES-WD for approval prior to adoption by the permittee.
 - e. Within 90 days of the effective date of this permit, the permittee shall submit to NHDES-WD a copy of its current sewer use ordinance if it has been revised since any previously approved submittal.
 - f. Within 120 days of the effective date of this permit, the permittee shall submit to NHDES-WD a current list of all industries discharging industrial waste to the municipal wastewater treatment plant. As a minimum, the list shall indicate the name and address of each industry, along with the following information: telephone number, contact person, products manufactured, industrial processes used, existing level of pretreatment, and list of existing industrial discharge permits with effective dates.

E. SPECIAL CONDITIONS**1. pH Limit Adjustment**

The Permittee may submit a written request to the EPA requesting a change in the permitted pH limit range to be not less restrictive than 6.0 to 9.0 Standard Units found in the applicable National Effluent Limitation Guidelines (Secondary Treatment Regulations in 40 C.F.R. Part 133) for this facility. The Permittee's written request must include the State's approval letter containing an original signature (no copies). The State's approval letter shall state that the Permittee has demonstrated to the State's satisfaction that as long as discharges to the receiving water from a specific outfall are within a specific numeric pH range, the naturally occurring receiving water pH will be unaltered. The letter must specify for each outfall the associated numeric pH limit range. Until written notice is received by certified mail from the EPA indicating the pH limit range has been changed, the Permittee is required to meet the permitted pH limit range in the respective permit.

F. REOPENER CLAUSE

This permit may be modified, or alternatively revoked and reissued, if a future analysis for a Total Maximum Daily Load (TMDL) or any other water quality based study of the Sugar River performed by EPA-New England and/or NHDES demonstrates the need for more stringent permit pollutant limits. Results from these studies will serve as the basis for additional permit limits. Any of these additional limits could be expressed in terms of concentration and/or mass where appropriate. Furthermore, should any of these studies result in a revision of the available dilution, current limits based on dilution could be revised. Results from a TMDL or any other water quality study not available at permit reissuance are considered "New Information". Modification of a permit based on new information is provided at 40 C.F.R. §122.62(a)(2).

ATTACHMENT A
FRESHWATER CHRONIC
TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable chronic (and modified acute) toxicity tests on three samples collected during the test period. The following tests shall be performed in accordance with the appropriate test protocols described below:

- Daphnid (Ceriodaphnia dubia) Survival and Reproduction Test.
- Fathead Minnow (Pimephales promelas) Larval Growth and Survival Test.

Chronic and acute toxicity data shall be reported as outlined in Section VIII. The chronic fathead minnow and daphnid tests can be used to calculate an LC50 at the end of 48 hours of exposure when both an acute (LC50) and a chronic (C-NOEC) test is specified in the permit.

II. METHODS

Methods to follow are those recommended by EPA in:

Lewis, P.A. et al. Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Third Edition. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH. July 1994, EPA/600/4-91/002.

Any exceptions are stated herein.

III. SAMPLE COLLECTION

For each sampling event, three discharge samples shall be collected. Fresh samples are necessary for Days 1, 3, and 5 (see Section V. for holding times). The initial sample is used to start the test on Day 1, and for test solution renewal on Day 2. The second sample is collected for use at the start of Day 3, and for renewal on Day 4. The third sample is used for renewal on Days 5, 6, and 7 (or until termination for the Ceriodaphnia dubia test). The initial (Day 1) sample will be analyzed chemically (see Section VI). Day 3 and 5 samples will be held until test

completion. If either the Day 3 or 5 renewal sample is of sufficient potency to cause lethality to 50 percent or more test organisms in any of the dilutions for either species, then a chemical analysis shall be performed on the appropriate sample(s) as well.

Aliquots shall be split from the samples, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses. The remaining samples shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater also describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1 mg/L chlorine. A thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) should also be run.

All samples held overnight shall be refrigerated at 4°C.

IV. DILUTION WATER

Grab samples of dilution water used for chronic toxicity testing shall be collected from the receiving water at a point upstream of the discharge free from toxicity or other sources of contamination. Avoid collecting near areas of obvious road or agricultural runoff, storm sewers or other point source discharges. An additional control (0% effluent) of a standard laboratory water of known quality shall also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S)**. Written requests for use of an alternate dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency-New England
JFK Federal Building (CAA)
Boston, MA 02203

(December 1995)

EPA NEW ENGLAND RECOMMENDED EFFLUENT TEST CONDITIONS FOR THE
FATHEAD MINNOW (PIMEPHALES PROMELAS) LARVAL SURVIVAL
AND GROWTH TEST¹

- | | |
|--|---|
| 1. Test type: | Static, renewal |
| 2. Temperature (°C): | 25 ± 1°C |
| 3. Light quality: | Ambient laboratory illumination |
| 4. Photoperiod: | 16 hr. light, 8 hr. dark |
| 5. Test chamber size: | 500 mL minimum |
| 6. Test solution volume: | Minimum 250 mL/replicate |
| 7. Renewal of test concentrations: | Daily using most recently collected sample. |
| 8. Age of test organisms: | Newly hatched larvae less than 24 hr. old |
| 9. No. larvae/test chamber and control: | 15 (minimum of 10) |
| 10. No. of replicate chambers/concentration: | 4 |
| 11. No. of larvae/concentration: | 60 (minimum of 40) |
| 12. Feeding regime: | Feed 0.1 g newly hatched, distilled water-rinsed <u>Artemia</u> nauplii at least 3 times daily at 4 hr. intervals or, as a minimum, 0.15 g twice daily, 6 hrs. between feedings (at the beginning of the work day prior to renewal, and at the end of the work day following renewal). Sufficient larvae are added to provide an excess. Larvae fish are not fed during the final 12 hr. of the test. |

*1 Method 2340 B (hardness by calculation) from APHA (1992) Standard Methods for the Examination of Water and Wastewater. 18th Edition.

*2 Total Residual Chlorine

Either of the following methods from the 18th Edition of the APHA Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

-Method 4500-CL E Low Level Amperometric Titration (the preferred method);

-Method 4500-CL G DPD Colorimetric Method.

or use USEPA Manual of Methods Analysis of Water and Wastes, Method 330.5.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Kärber
- Trimmed Spearman-Kärber
- Graphical

Reference the flow chart on page 84 or page 172 of EPA 600/4-91/002 for the appropriate method to use on a given data set.

Chronic No Observed Effects Concentration (C-NOEC)

Methods of Estimation:

- Dunnett's Procedure
- Bonferroni's T-Test
- Steel's Many-One Rank Test
- Wilcoxin Rank Sum Test

Reference the flow charts on pages 50, 83, 96, 172, and 176 of EPA 600/4-91/002 for the appropriate method to use on a given data set.

In the case of two tested concentrations causing adverse effects but an intermediate concentration not causing a statistically significant effect, report the C-NOEC as the lowest concentration where there is no observable effect. The definition of NOEC in the EPA Technical Support Document only applies to linear dose-response data.

VIII. TOXICITY TEST REPORTING

A report of results will include the following:

- Description of sample collection procedures, site description;
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody; and
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).

- Any other observations or test conditions affecting test outcome.

Appendix B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

IN THE MATTER OF)	DOCKET NO. 09-015
Newport, New Hampshire)	
NPDES Permit No. NH0100200)	FINDINGS OF VIOLATION
)	
)	AND
)	
Proceedings under Sections 308 and)	ORDER FOR COMPLIANCE
309(a)(3) of the Clean Water Act,)	
as amended, 33 U.S.C. §§ 1318 and)	
1319(a)(3))	

I. STATUTORY AUTHORITY

The following Findings are made and ORDER issued pursuant to Sections 308 and 309(a)(3) of the Clean Water Act, as amended (the "Act"), 33 U.S.C. §§ 1318 and 1319(a)(3). Section 309(a)(3) of the Act grants to the Administrator of the U.S. Environmental Protection Agency ("EPA") the authority to issue orders requiring persons to comply with Sections 301, 302, 306, 307, 308, 318 and 405 of the Act and any permit condition or limitation implementing any of such sections in a National Pollutant Discharge Elimination System ("NPDES") permit issued under Section 402 of the Act, 33 U.S.C. § 1342. Section 308(a) of the Act, 33 U.S.C. § 1318(a), authorizes EPA to require the submission of any information required to carry out the objectives of the Act. These authorities have been delegated to EPA Region I's Regional Administrator, and in turn to the Director of the Office of Environmental Stewardship (the "Director").

The Order herein is based on findings of violations of Section 301 of the Act, 33 U.S.C. § 1311, and the conditions of NPDES Permit No. NH0100200. Pursuant to Section 309(a)(5)(A) of the Act, 33 U.S.C. § 1319(a)(5)(A), the Order provides a schedule for compliance which the Director has determined to be reasonable.

II. FINDINGS

The Director makes the following findings of fact:

1. The Town of Newport (the "Town" or "Permittee") is a municipality, as defined in Section 502(4) of the Act, 33 U.S.C. § 1362(4), established under the laws of the State of New Hampshire.
2. The Town is a person under Section 502(5) of the Act, 33 U.S.C. § 1362(5). The Town is the owner and operator of a Publicly-Owned Treatment Works (the "POTW"), which includes a wastewater treatment facility (the "WWTF") from which pollutants, as defined in Section 502(6) of the Act, 33 U.S.C. § 1362(6), are discharged from a point source, as defined in Section 502(14) of the Act, 33 U.S.C. § 1362(14), to the Sugar River. The WWTF is a 1.3 million gallon per day ("MGD") secondary treatment facility that discharges an average daily flow of 0.65 MGD of treated wastewater to the Sugar River. The Sugar River flows into the Connecticut River, which flows into Long Island Sound and the Atlantic Ocean. All are Class B waterways, waters of the United States as defined in 40 C.F.R. § 122.2, and navigable waters under Section 502(7) of the Act, 33 U.S.C. § 1362(7).
3. Section 301(a) of the Act, 33 U.S.C. § 1311(a), makes unlawful the discharge of pollutants to waters of the United States except in compliance with, among other things, the terms and conditions of an NPDES permit issued pursuant to Section 402 of the Act, 33 U.S.C. § 1342.
4. On April 18, 2007, the Town was issued NPDES Permit No. NH0100200 ("NPDES Permit") by the Director of the Office of Ecosystem Protection of EPA, Region I, under the authority of Section 402 of the Act, 33 U.S.C. § 1342. The NPDES Permit became effective on July 1, 2007 and expires on June 30, 2012.
5. The NPDES Permit authorizes the Town to discharge pollutants from the WWTF through a point source (Outfall No. 001) to the Sugar River, subject to the effluent limitations, monitoring requirements and other conditions specified in the NPDES Permit.

6. Section I.A.1. of the NPDES Permit includes effluent limitations for, among other things, total phosphorus, acute and chronic whole effluent toxicity ("WET"), E. coli, biochemical oxygen demand, and total suspended solids.
7. The WWTF was not designed to achieve phosphorus removal. Since July 2007, the Town has discharged wastewater containing total phosphorus in excess of the limits set forth in the NPDES Permit. Also, the Town's WWTF discharges have violated the acute and chronic whole effluent toxicity limits of the NPDES Permit.
8. The Permittee's discharges of pollutants in excess of the limits contained in the NPDES Permit violate the conditions of the NPDES Permit and, therefore, violate Section 301(a) of the Act, 33 U.S.C. § 1311(a).

III. ORDER

Accordingly, it is hereby ordered that:

1. Wastewater Treatment Facilities Upgrade
 - a. By December 31, 2009, the Town shall evaluate and submit to EPA and the New Hampshire Department of Environmental Services (the "NHDES") a report regarding the capability of the WWTF's unit operations and processes ("WWTF Upgrade Facilities Plan") to comply with the NPDES Permit and shall identify the upgrades and process modifications required to meet the NPDES Permit's limits. The WWTF Upgrade Facilities Plan shall include an evaluation of the extraneous flows that enter the Town's collection system during wet weather and recommendations to address capacity issues associated with excessive infiltration and inflow.
 - b. The WWTF Upgrade Facilities Plan shall also include a schedule for implementation of those recommendations that are required to achieve compliance with the NPDES Permit as soon as practicable, but no later than October 31, 2012 (the "Facilities Plan Implementation Schedule").
 - c. The Facilities Plan Implementation Schedule submitted pursuant to Paragraph III.1.b. of this Order shall be incorporated and enforceable

hereunder upon their approval by, and as amended by, EPA and the Permittee shall thereafter meet the milestones contained therein.

- d. The Town shall achieve compliance with the total phosphorus limits contained in the NPDES permit by no later than October 31, 2012.

2. Interim Effluent Limitations

- a. From the effective date of this Order until the date the WWTF's improvements are fully operational or when EPA determines that the Town has not complied with the interim milestones set forth in this Order, the Town shall comply with the interim effluent limitations and monitoring requirements contained in **Attachment A** of this Order. The Permittee shall also comply with all effluent limitations, monitoring requirements and other conditions specified in the NPDES Permit for the parameters not covered in **Attachment A**.

3. Whole Effluent Toxicity:

The Town shall:

- a. By December 31, 2009, submit to EPA and the NHDES a detailed engineering report that recommends both short-term and long-term corrective measures and a schedule ("Corrective Action Plan Schedule") to comply with the WET limits of the NPDES Permit.
- b. The Corrective Action Plan Schedule submitted pursuant to Paragraph III.3.a. of this Order shall be incorporated and enforceable hereunder upon the Corrective Action Plan Schedule's approval by, and as amended by, EPA.

4. Quarterly Progress and Work Projection Reports:

Beginning with the calendar quarter ending June 30, 2009 and continuing through the calendar quarter when the WWTF upgrade project is completed and fully operational or the WWTF discharge has been eliminated, the Town shall submit quarterly reports on the Town's progress in implementing the provisions of this Order. The reports shall be submitted by the last day of the month

following the calendar quarter monitoring period. At a minimum, these progress reports shall include a description of:

- a. The activities undertaken during the reporting period directed at achieving compliance with this Order;
- b. The status of all plans, reports, and other deliverables required by this Order that the Town completed and submitted during the reporting period; and
- c. The expected activities to be completed during the next reporting period in order to achieve compliance with this Order.

IV. NOTIFICATION PROCEDURES

1. Where this Order requires a specific action to be performed within a certain time frame, the Permittee shall submit a written notice of compliance or noncompliance with each deadline. Notification shall be mailed within fourteen (14) days after each required deadline. The timely submission of a required report shall satisfy the requirement that a notice of compliance be submitted.
2. If noncompliance is reported, notification shall include the following information:
 - a. A description of the noncompliance;
 - b. A description of any actions taken or proposed by the Permittee to comply with the lapsed schedule requirements;
 - c. A description of any factors that explain or mitigate the noncompliance; and
 - d. An approximate date by which the Permittee will perform the required action. After a notification of noncompliance has been filed, compliance with the past-due requirement shall be reported by submitting any required documents or providing EPA with a written report indicating that the required action has been achieved.
3. Submissions required by this Order shall be in writing and shall be submitted to the following addresses:

U.S. Environmental Protection Agency, Region I
Office of Environmental Stewardship
One Congress Street, Suite 1100 (SEW)
Boston, MA 02114-2023
Attn: Joy Hilton

and

New Hampshire Department of Environmental Services
Bureau of Wastewater Engineering
P.O. Box 95 - 29 Hazen Drive
Concord, NH 03302-0095
Attn: Tracy L. Wood, P.E.

V. GENERAL PROVISIONS

1. This Order does not constitute a waiver or a modification of the terms and conditions of the NPDES Permit. The NPDES Permit remains in full force and effect. EPA reserves the right to seek any and all remedies available under Section 309 of the Act, 33 U.S.C. § 1319, as amended, for any violation cited in this Order.
2. This Order shall become effective upon receipt by the Permittee.

03/06/09
Date

Susan Studlien
Susan Studlien, Director
Office of Environmental Stewardship
Environmental Protection Agency, Region I

In the Matter of the Town of Newport, New Hampshire

ATTACHMENT A

INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (From the effective date of the Administrative Order until the earliest of: (1) the date the Facilities Plan improvements are fully operational; (2) October 31, 2012; or (3) when EPA determines that the Town has not complied with the interim milestones set forth in this Order.)

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	<u>Concentration</u>		<u>Measurement Frequency</u>	<u>Sample Type</u>
	<u>Average Monthly</u>	<u>Maximum Daily</u> (specify units)		
Total Phosphorus November 1 st through March 31 st	3.1 mg/l	Report ¹	1/Week	Grab
Total Phosphorus April 1 st through October 31 st	3.7 mg/l	Report ¹	1/Week	Grab

¹ Report mg/l

Appendix C

**ANALYSIS TO IDENTIFY THE CAUSES OF
WHOLE EFFLUENT TOXICITY (WET) FAILURE**

**NEWPORT WASTEWATER TREATMENT FACILITY
20 PUTNAM RD.
NEWPORT, NH 03773**

JANUARY 2010

PREPARED FOR:

**TOWN OF NEWPORT NEW HAMPSHIRE
15 SUNAPEE STREET
NEWPORT, NH 03773**

PREPARED BY:

**AECOM
500 SOUTHBOROUGH DRIVE
SOUTH PORTLAND, MAINE 04106**

**AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT 06067**

AECOM

ANALYSIS TO IDENTIFY THE CAUSES OF WHOLE EFFLUENT TOXICITY (WET) FAILURE

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1.0 INTRODUCTION

As part of the Administrative Order dated March 6, 2009, EPA Region 1 determined that the town shall undertake an evaluation culminating in an engineering report that would recommend both long and short term corrective measures and a schedule to comply with the WET limits of the NPDES permit. As part of this, AECOM undertook a desktop evaluation of the likely reason(s) for WET failures in July 2005, August 2007, August 2008 and May 2009.

2.0 WHOLE EFFLUENT TOXICITY (WET) TESTING

Chemical analysis of wastewater discharges is inadequate by itself for regulating toxicity in that many toxic pollutants cannot be detected by commonly available methods. Many of the chemicals that can be detected have little or no toxicity information available for them and many of the chemicals with known toxicity have unknown additive or synergistic effects when present in wastewater.

The Clean Water Act prohibits the discharge of contaminated materials in toxic amounts to the waterways of the nation. To provide a way of determining the toxicity of effluent discharges, the U.S. Environmental Protection Agency developed a procedure which involves exposing test organisms to various dilutions of the effluent and observing the effects on the organisms' survival and reproduction. The procedure is called Whole Effluent Toxicity (WET) testing, and the State of New Hampshire requires wastewater treatment plants to perform this test on their effluent on a regular basis.

Two different species, one invertebrate and one vertebrate, are tested. The invertebrate is a species of water flea called *Ceriodaphnia dubia*. The vertebrate is *Pimephales promelas* or fathead minnow, which is a species of temperate freshwater fish belonging to the *Pimephales* genus of the cyprinid family. The fathead minnow's natural geographic range extends throughout much of North America, and the Northeastern United States. This species is important as a biological model in aquatic toxicology studies. Because of its relative hardiness and large number of offspring produced, EPA guidelines outline its use for the evaluation of acute and chronic toxicity of samples or chemical species in vertebrate animals.

Acute WET tests involve exposing test organisms to serial dilutions of effluent in order to determine the selected organisms' survival while exposed to the wastewater treatment facility's (WWTF's) final effluent at 48 or 96 hours. Test samples are taken inside of the mixing zone and close to the discharge point. The point of compliance for the acute test is that there must be no lethality measured by the acute WET test.

Chronic WET tests are short-term (7-day) chronic tests which evaluate the selected organisms' survival, growth and reproduction rate. These tests assess

the critical life stages of the organisms' fertilization and development. The chronic point of compliance is the edge of a mixing zone where receiving water must be suitable for long-term habitation. These results are compared to the organisms' survival in a control sample of the receiving water taken outside the WWTF's mixing zone. Compliance is reached when no significant difference is observed between the control sample and the WET test sample.

3.0 PASSING VERSES FAILING WET

Passing: When the difference between the critical dilution (% effluent at the mixing zone) and the control is not statistically significant, the test is considered to have passed.

Failing: When the difference between the critical dilution (% effluent at the mixing zone) and the control is statistically significant, the test is considered a failure.

4.0 WET TESTING FAILURE EVALUATION

Of the four years worth of test data (2005-2009) evaluated, there were four WET test failures. Each will be discussed separately.

4.1 MAY 2009 WET TESTING

Samples of WWTF Final Effluent and receiving water from the Sugar River were collected on May 4, 6, and 8, 2009. Subsequent WET testing showed a chronic failure for both species and acute failure for the fathead minnow. Consequently the test was considered a failure.

4.1.1 EVALUATION

In the previous year, an Ashbrooke Stratasand media filter designed to remove total phosphorous was pilot tested at the Newport WWTF. The Ashbrooke unit required the use of a cationic polymer emulsion and a coagulant to assist the unit in removal of the fine suspended solids, precipitating phosphate, and removing them along with the insoluble total phosphorous contained within the coagulated fine solids. A carboy of FBS-C304 Cationic Polymer Emulsion manufactured by Fort Bend Services, Inc of Strafford, Texas that was purchased for this testing. A material safety data sheet (MSDS) for this material is included in Appendix A. Testing the Ashbrooke unit with this polymer and polyaluminum chloride (PACl) coagulant was unsuccessful and the pilot ceased operation after utilizing all but about 275 gallons of the emulsion. In an effort to dispose of the polymer from the site, it was mixed with PACl and bled into the former chlorine contact tank over a period of weeks. Likely

dose calculations are included in Appendix A. Within a day of commencing this activity, samples were taken of final effluent for WET testing.

When reviewing the lab testing performed as part of the WET testing, it was noted that the concentration of aluminum in the final effluent on May 4, 2009 was 0.62 mg/L. This concentration is approximately 7 times higher than the recommended not to exceed concentration of 0.087 mg/L that provides protection from chronic toxicity and much higher than the plant normally experiences. Further the aluminum concentration approached the not to exceed concentration of 0.75 mg/L that provides protection from acute toxicity.

Aluminum is used at this facility in the form of PACI which is used for solids processing and septage handling but, as described above, was also used with the polymer in its disposal.

It is unlikely that the two solids processing operations were the cause of the high aluminum in the discharge. The use of PACI in septage is as a settling aid. Septage solids are then hauled off site and the supernatant is bled to the lagoons, which have a large dilution capacity. Also, septage is received at this plant in small quantities and infrequently because of its loading effect on the lagoon process and significant handling issues. As far as the use of PACI for solids processing, there was no solids handling activities for all of 2009, so this could not be the cause of excess aluminum.

Therefore, it is apparent that the dosing of PACI with the polymer was the cause of the high aluminum in the effluent.

4.1.2 CONCLUSION

It is our opinion that the failure of the WET testing conducted on the samples collected May 4, 6, and 8, 2009 is a direct result of a combination of a discharge of a polymer toxic to aquatic life in combination with a high concentration of Aluminum.

4.2 AUGUST 2008 WET TESTING

Samples of WWTF Final Effluent and receiving water from the Sugar River were collected on August 4, and 6, 2008. Subsequent WET testing showed an acute toxicity to daphnia and a statistically significant reduction in reproduction which violates the No Observed Effect Concentration (NOEC). Consequently the acute and chronic WET tests performed on daphnia were considered failures.

4.2.1 EVALUATION

When reviewing the monthly operations report for the WWTF the concentration of $\text{NH}_3\text{-N}$ in the final effluent was about 25% (3 mg/L) of the average annual concentration of 13 mg/L. This coupled with the warmer water temperatures of 23° C (73° F), long hydraulic retention time, and an abundance of $\text{NH}_3\text{-N}$ created a near ideal environment for nitrification. Nitrification consumes alkalinity and will reduce the pH of the wastewater. Without denitrifying, which would create a portion of the alkalinity destroyed by nitrification, or adding alkalinity to the process in the form of soda ash or other buffering chemical, the alkalinity will be lowered and the pH will drop substantially. For this test period, the pH ranged from 6.0 to 6.5. Normal pH at this facility averages approximately 7.0. As noted in the previous years operating reports for this facility, a drop in pH is consistent with nitrification.

4.2.2 CONCLUSION

It is our opinion that the failure of the WET test is caused by a low pH environment caused by complete nitrification of the wastewater. Previous years monthly operating reports (MOR's) show a similar pattern when nitrification occurs - a lowering of pH coupled with a resultant near failure of WET testing.

During this time we noted no other unusual operating conditions that could account for the WET failure.

4.3 AUGUST 2007 AND JULY 2005 WET TESTING

Samples of WWTF Final Effluent and receiving water from the Sugar River were collected on August 6, 8, and 10, 2007. Subsequent WET testing showed an across the board chronic and acute failure to the fathead minnows and the daphnia. The July 2005 failure of the daphnia was for a statistically significant reduction in reproduction which violates the No Observed Effect Concentration (NOEC).

4.3.1 EVALUATION

A review of operating records and test results show no anomaly in the associated test data, so a table of ammonia results was compiled to better evaluate the likelihood of ammonia being the cause of the failures.

The term ammonia refers to two chemical species of ammonia which are in equilibrium in water (NH_3 , un-ionized and NH_4^+ , ionized). Tests for ammonia usually measure total ammonia (NH_3 plus NH_4^+). The toxicity to ammonia is primarily attributable to the un-ionized form (NH_3), as opposed to the ionized form (NH_4^+). In general, more NH_3 and greater toxicity exists at higher pH.

However, limited data also indicate that less NH_3 is needed at lower pH to produce its toxic effects.

The ammonia profile in the effluent is included in Table 1 below:

TABLE 1 MONTHLY EFFLUENT AMMONIA RESULTS - CONCENTRATION VALUE													
YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVERAGES
2005													
	14	16	19	13	24	14	18	21	19	16	3	9	
	15	16	18	12	11	30	22	19	19	10	9	10	
AVG.	15	16	18	13	17	22	20	20	19	13	6	10	16
MAX.	15	16	19	13	24	30	22	21	19	16	9	10	30
2006													
	14	12	14	18	15	15	16	15	18	16	0	9	
	14	13	30	17	15	14	16	17	19	9	0	11	
AVG.	14	12	22	17	15	15	16	16	19	12	0	10	14
MAX.	14	13	30	18	15	15	16	17	19	16	0	11	30
2007							22						
	16	17	21	19	7	16	24	23	23	0	0	7	
	15	17	21	20	8	17	25	24	23	0	1	9	
AVG.	16	17	21	20	8	17	24	24	23	0	1	8	15
MAX.	16	17	21	20	8	17	25	24	23	0	1	9	25
2008													
	15	18	16	10	10	18	26	5	1	5	16	17	
	17	18	14	9	11	20	29	2	2	9	15	18	
AVG.	16	18	15	10	11	19	28	3	2	7	16	18	13
MAX.	17	18	16	10	11	20	29	5	3	9	16	18	29

1 WET Testing months

23 WET Testing months with failures

5.1.2 AUGUST 2008 WET TESTING

In our opinion, the cause of the failure in August 2009 WET Test was low pH caused by nitrification.

As a first step and for both a short and long term approach in controlling effluent pH during nitrification we recommend the plant operators add a pH adjusting chemical such as Soda Ash to increase alkalinity and pH when the plant enters nitrification and throughout the nitrification period. The ability to accomplish this is available at the WWTF so implementation should be immediate.

From a long term non-chemical alternative perspective, methods to nitrify or denitrify year round would be considered. Lagoons are notoriously difficult processes with which to remove nutrients because of the issues of cold weather and lack of biomass. A move to an activated sludge process designed for nitrification and denitrification would also alleviate the issue long term.

5.1.3 AUGUST 2007 AND JULY 2005 WET TESTING

WET Test failure for these dates coincides with high $\text{NH}_3\text{-N}$ concentrations in the final effluent.

Short term, reducing the solids inventory in the lagoon by removing solids collected in the bottom of the lagoon may help in reducing ammonia generated in the sludge. If solids are left too long in the lagoon, anaerobic digestion can occur, releasing ammonia. Additionally, mixing of the lagoons with strategically located surface mixers would create a better treatment environment by reducing dead zones and mixing the solids so that it does not collect in lagoon dead areas.

From a schedule perspective, solids removal could be implemented within three months. The addition of mixers would take approximately 8 months to specify, purchase and install. The mixer installation should be tied in with the Facilities Planning report for phosphorus removal as this report may identify other alternatives as preferred methods to address ammonia.

From a long term perspective, methods to nitrify or denitrify year round would be considered. Lagoons are notoriously difficult processes with which to remove nutrients because of the issues of cold temperatures and lack of biomass. A transition to an activated sludge process designed for nitrification and denitrification would alleviate the problem long term, however it is important to note here that the data supporting this conclusion is limited and that further evaluation and testing would be suggested to corroborate this conclusion before significant capital investment is made.

APPENDIX 1

Appendix D



April 2, 2009

Ms. Susan Studien, Director
Office of Environmental Stewardship
US EPA – Region 1
One Congress Street, Suite 1100
Boston, MA 02114-2023

RE: NPDES Permit No. NH0100200
Administrative Order Docket No. 09-015

Dear Ms. Studien:

This letter is in response to Paragraph 1a, Section 3 *ORDER* of the EPA's Administrative Order (AO) issued to the Town of Newport as received on March 6, 2009.

Paragraph 1a states *"The Wastewater Treatment Facility Upgrade Facilities Plan shall include an evaluation of the extraneous flows that enter the Town's collection system during wet weather and recommendations to address capacity issues associated with excessive infiltration and inflow."*

In response to the EPA's direction in Paragraph 1a, please find the following enclosed:

1. Water & Sewer Superintendent Robert K. Naylor's memo to me dated March 31, 2009 providing a chronological listing of projects constructed by the Town of Newport that replaced sewer mains and sewer service lines between the years of 1993 and 2007.
2. Wastewater Treatment Plant Superintendent Arnold Greenleaf's chart titled *Averaged Annual Flow vs. Total Rainfall*, dated April 1, 2009, for Newport's WWTF.

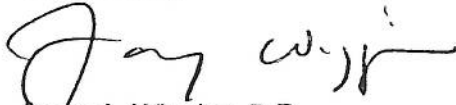
A review of Mr. Naylor's project history demonstrates the Town's proactive nature regarding replacement of sewer lines, services and stations. These projects reflected a serious investment by the rate payers over those years. Correspondingly, a review of the Wastewater Treatment Facility's inflow vs. rainfall over the same period, demonstrates the effect of the Town's investment in sewer rehabilitation. It is immediately apparent that total annual flows to the plant have been reduced.

Please note that even though rainfall has dramatically increased in the latter years, the WWTF's flows have not.

In addition to almost three (3) miles of sewer main/services rehabilitated, the Town has also replaced two sewer stations (2003 Parkview Sewer Station and 2007 Guild Sewer Station).

I trust this information adequately addresses the WWTF Upgrade Facilities Plan requirement with regard to evaluation of the extraneous flows as required by the AO. If this is not the case, please contact me at 603-863-3650 or at the address below.

Respectfully,




Larry A. Wiggins, P.E.
Public Works Director
Town of Newport, NH

LAW/jas

cc: D. O'Neill, Town Manager (w/ encl)
P. Brown, Finance Director (w/ encl)
R. Naylor, Water & Sewer Supt. (w/ encl)
A. Greenleaf, WWTP Supt. (w/ encl)
Tracy L. Wood, P.E., NHDES (w/ encl)
Joy Hilton, USEPA (w/ encl)

Memo

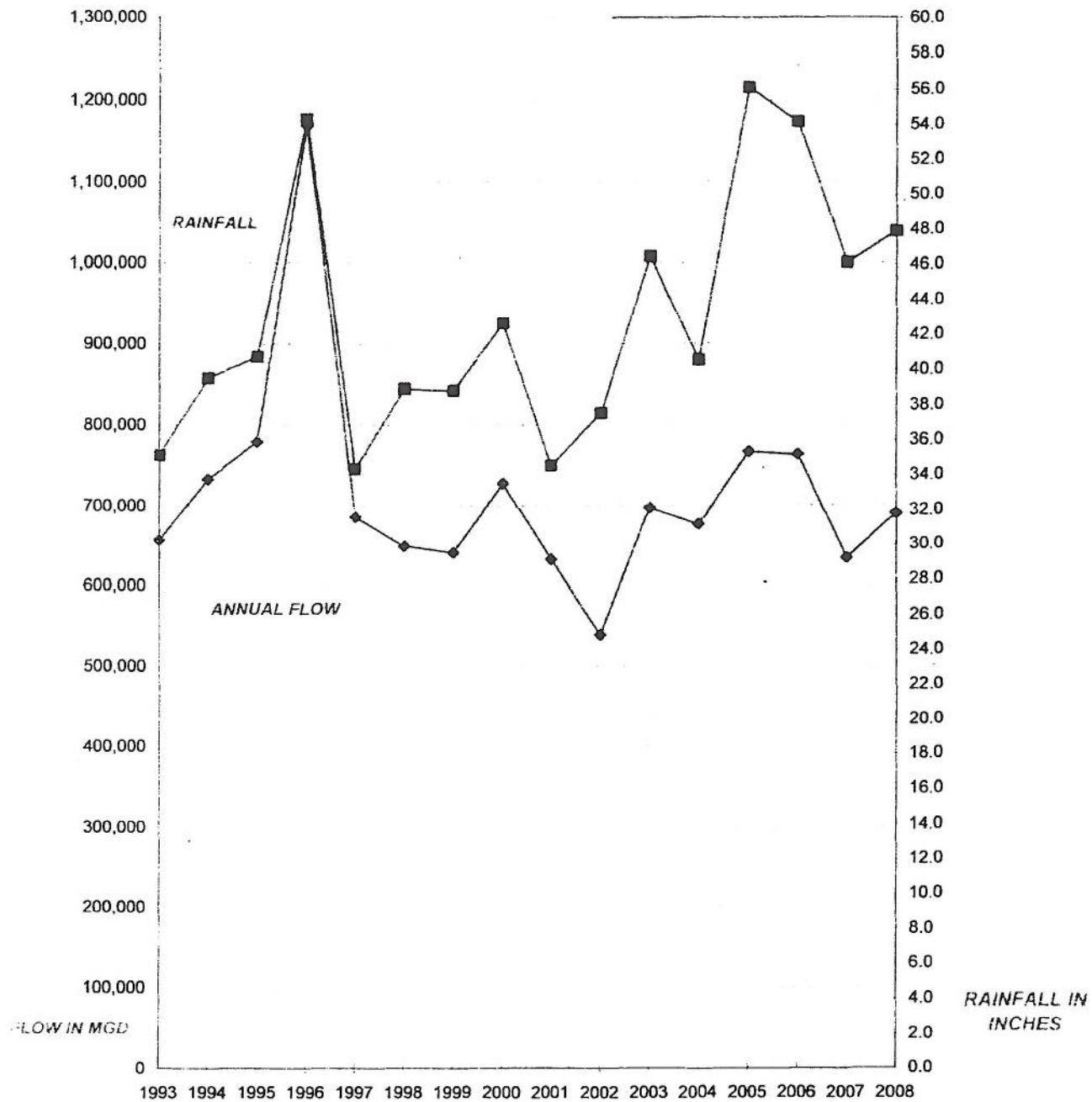
To: Larry Wiggins, Director of Public Works
From: Robert K. Naylor, Supt. of Water & Sewer Dept. 
Subject: Collection System Upgrades
Date: March 31, 2009

Between the years 1993 and 2005, we have replaced over 10,100 feet of our sewer system main lines. In addition we have replaced more than 4,200 feet of residential sewer service lines and have grout sealed more than 1,400 feet of old sewer main lines.

I have attached a chart of these sewer projects.

Year	Project	Streets	Main Lines	Service Lines	Main Totals	Service Line Totals
1993	Green Road Project					
		Dale	310	61		
		Cross Country	300			
		Middle	280	475		
		Oak	1,025	644		
		Victory	295			
		Walnut	520	305		
		North Main		91	2,730	1,576
1996	Pleasant St Project					
		Middle	280	230		
		Pleasant	590	353		
		Campus	110	175		
		Syndicate	752	401		
		Myrtle	10	189		
		Court	150	34	1,892	1,382
1998	Sugar River Hydro					
		Cross Country			569	
1998	Central Street Project					
		Central	800	110	800	110
2002	South Main Street Project					
		South Main	1,915	688	1,915	688
2003	Parkview Project					
		Parkview	450		450	
2003	Grout Sealing Project	Maple & Laurel	1,414			
2005	Cheney					
		Cheney	1,525	503		503
		Lincoln	25		1,550	
2007	Guild Pump Station Project	Cross Country	275		275	
Total Sewer Main Replacement:		10,181				
Total Grout Seal:		1,414				
Total Service Line Replacement:		4,259				

AVERAGED ANNUAL FLOW VS. TOTAL RAINFALL FOR THE LAST 16 YEARS AT THE WWTF.



Appendix E



Report

Workshop Report

Phosphorus Removal Upgrade Project Town of Newport New Hampshire

Prepared for:

Town of Newport, New Hampshire
Public Works Department
15 Sunapee Street, Suite 1
Newport, NH 03773-1497

Prepared by:

AECOM
300 Baker Avenue
Concord, MA 01742-2131

September 2009

Updated October 2009

J.N. 114425



AECOM
300 Baker Avenue
Suite 290
Concord, MA 01742
www.aecom.com

978 371 4000 tel
978 371 2468 fax

October 7, 2009

Mr. Larry A. Wiggins, P.E.
Public Works Director
Public Works Department
15 Sunapee Street, Suite 1
Newport, NH 03773-1497

Subject: Workshop Report
Phosphorus Removal Upgrade Project
Newport NH Wastewater Treatment Facility

Dear Larry:

We are pleased to submit the Draft Workshop Report presenting the results of the workshop to evaluate phosphorus removal alternatives at the Newport, NH wastewater treatment facility. After review and incorporation of your comments, this report will be used as the basis for our plan to move forward with identification of the recommended means for phosphorus removal at the Newport facility.

Based on the discussions with EPA and the need to attain a phosphorus level in the effluent of 0.42 mg/l, we have included the means to accomplish this in this report.

If you have any questions regarding this report, please contact me at your earliest convenience.

Very truly yours,

AECOM

Dennis Setzko, P.E.
Project Director

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- B. ADD-ON TECHNOLOGIES

SECTION 1

EXECUTIVE SUMMARY

A. GENERAL

The Town of Newport retained AECOM to perform a phosphorus removal study at the wastewater treatment plant. As part of this evaluation, AECOM suggested that a workshop be conducted to identify ideas for phosphorus removal, evaluate options, and identify a plan to move forward. This workshop was conducted on September 24, 2009. This report is a summary of that workshop.

B. OBJECTIVE

The workshop platform was designed to identify all phosphorus removal options available to Newport to remove phosphorus to a seasonal limit of less than 0.42 mg/l total phosphorus (April 1 to October 31), and also to a less than 1.0 mg/l value (November 1 to March 31). These two values are included in the newly issued NPDES permit. The workshop also was designed to identify nitrogen removal options available to Newport should nitrogen limits be enforced in the future.

C. WORKSHOP RESULTS

The workshop identified all viable options for phosphorus removal to the limits required and then identified preferred options, after discussions, to move forward and evaluate in detail. All processes identified below are the preferred options that have the ability to meet a permit limit of less than 0.42 mg/l total phosphorus:

1. Coagulation followed by direct filtration (media or cloth) following the lagoons;
2. Ballasted sedimentation unit processes following the lagoons;
3. Upflow filtration following the lagoons.

The workshop identified nitrogen removal options as well. These options will be identified in the body of the report.

D. ACTION PLAN

The plan will be to pilot the preferred processes described above and to review all of them in greater detail. Coagulation with filtration is a well known and understood process and will be reviewed from a capital and operational cost perspective. Filtration with a cloth media filter is proposed to determine its ability to remove coagulated algae.

The least complex ballasted process, as determined by AECOM, will be piloted. Each manufacturer of a ballasted process will also receive a request from AECOM for details surrounding their proposed process to meet a 0.42 mg/l phosphorus limit including associated capital and operational costs.

Lastly, an upflow filter such as the Parkson Dynasand will be piloted and investigated.

SECTION 2

PHOSPHOROUS REMOVAL ALTERNATIVES

A. INTRODUCTION

AECOM assembled a team of nutrient removal experts to review the available methods of phosphorus removal and discuss the options that fit the needs of Newport best. Technical and operations experts met with the stated goal to short list a group of phosphorus removal processes that will be investigated further. Prior to the workshop, the team reviewed treatment plant records, plant schematics, record drawings, DMR data and reviewed loadings and flows to the plant. The workshop itself was then performed on September 24, 2009. The workshop agenda is provided in Appendix A.

Once the workshop convened, AECOM staff identified operational and technical concerns that are important to the project and need to be taken into account with the phosphorus removal processes under review. The list is shown below.

1. Phosphorus removal to less than 0.42 mg/l. The process needs to be flexible for potential future lower limits;
2. Sustainability;
3. Low temperature operation;
4. Process designed for 1.3 million gallons per day (plant treatment capacity);
5. No increase in odors;
6. Low influent pH;
7. Minimize chemical use;
8. Unknown nutrient loading speciation;
9. Algae growth;
10. Ease of maintenance;
11. Redundancy;
12. Flexibility for Nitrogen removal in the future;
13. Lagoon structural issues;
14. Manual solids processing;
15. Rehabilitate septage handling;
16. Upgrade UV disinfection;
17. Utilize automated process control to allow weekends off.

After this discussion, the workshop participants identified various processes for phosphorus removal to both the winter and summer limits, but focused on those that will meet the lower limits consistently. The full range of ideas included:

Modifications to existing process:

1. TP1 – SBR Process with chemically enhanced P-removal

2. TP2 – Add chemicals to second lagoon. Construct sludge removal improvements.
Do not install lagoon covers.
3. TP3 – TP2 improvements with lagoon covers.
4. TP4 – TP2 improvements with solids separation downstream (filtration).
5. TP5 – TP3 with solids separation downstream (filtration)
6. TP6 – Alternative lagoons in SBR mode.

Add-on processes:

7. TP7 - Ballasted sedimentation.
8. TP8 – Flocculating clarifier.
9. TP9 – Coagulation followed by direct filtration.
10. TP10 – Upflow filtration.
11. TP11 – Dissolved Air Flotation.

B. EVALUATION PROCESS

All processes were presented and discussed with the group. A qualitative ranking system which included assigning a value from 1-5 for each idea was targeted to each idea. Those ideas that ranked 4 or 5 (the highest ranking) were evaluated further. Those ranking 3 or less were deemed marginal and unsuitable for Newport for any number of reasons. Ideas that passed this initial screening were:

Modifications to existing process:

1. TP1 – SBR Process with chemically enhanced P-removal
2. TP3 – TP2 improvements with lagoon covers.
3. TP4 – TP2 improvements with solids separation downstream (filtration).
4. TP5 – TP3 with solids separation downstream (filtration)

Add-on processes:

5. TP7 - Ballasted sedimentation.
6. TP8 – Flocculating clarifier.
7. TP9 – Coagulation followed by direct filtration.
8. TP10 – Upflow filtration.
9. TP11 – Dissolved Air Flotation.

After this initial screening, the following evaluation criteria were used to further screen the remaining ideas:

1. Ability to accept septage ,
2. Future Permit P,
3. Future Permit N,